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STENOPUS PYRSONOTUS, A NEW SPECIES OF
STENOPODIDEAN SHRIMP FROM THE INDO-WEST
PACIFIC REGION (CRUSTACEA: DECAPODA)

Joseph W. Goy and Dennis M. Devaney

Abstract.—A new species of shrimp in the genus *Stenopus* from the Indo-West Pacific region is described and figured. Specimens have been collected from the Hawaiian Islands and Mauritius. The new species, *Stenopus pyrsonotus*, is closely related to *S. hispidus* but is easily distinguished by morphological differences in the rostrum, telson, and spinulation of the body as well as by coloration. A key to the 4 described species from the Indo-West Pacific is included.

Three of the 5 previously reported species of *Stenopus* are found in the Indo-West Pacific region. *Stenopus hispidus* has a circumtropical distribution (Holthuis, 1946), *S. tenuirostris* is known from the Indian Ocean and Malay Archipelago (Bruce, 1976), and *S. zanzibaricus* was recently described from off the coast of Zanzibar (Bruce, 1976). Collections over several years at Mauritius and in the Hawaiian Islands have provided some interesting specimens of a *Stenopus* that show a striking color pattern differing markedly from the other three Indo-West Pacific species. Besides this distinctive coloration, morphological characters distinguish the specimens from the other species in the genus. They are described here as representing a new species. Specimens recorded herein are deposited in the Bernice P. Bishop Museum (BPBM), Honolulu and the National Museum of Natural History (USNM), Washington, D.C. All material recorded below is considered in the type-series.

Stenopus pyrsonotus, sp. nov.

Figs. 1-6

Material examined.—HAWAIIAN ISLANDS: OAHU, off Pokai Bay, depth 22.9 m, 13 July 1975, G. Fukuda coll., USNM 173917 (Holotype), USNM 173918 (Allotype), USNM 173919 (Paratype); off Pokai Bay, depth 24.4 m, 29 July 1969, J. E. Randall, S. Swerdloff and D. Chave coll., BPBM S8577, 1 specimen; off Lahilahi Point, in cave, depth 27.4 m, 11 July 1970, J. E. Randall coll., BPBM S8287, 1 specimen; ¼ mile east of Manana Islet (Rabbit Island), from bilge tank of sunken boat, depth 68 m, 14 Oct. 1970, coll. W. D. Madden *et al.*, BPBM S7887, 3 specimens; south of Pokai Bay, depth 22.9 m, under ledge along reef outcrop, 14 Dec. 1972, D. M. Devaney

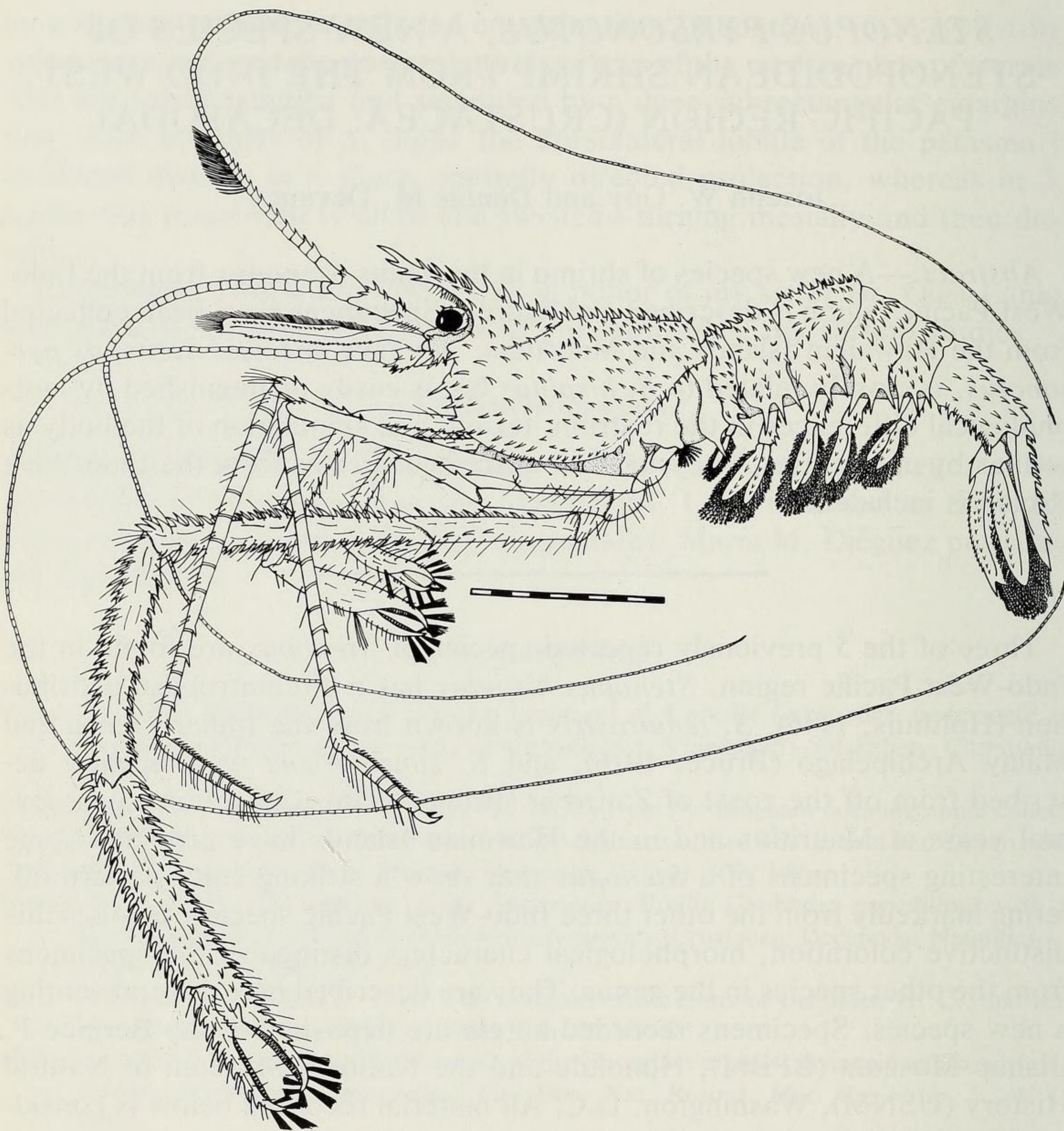


Fig. 1. *Stenopus pyrrsonotus*, holotype, male. Scale in mm.

coll., BPBM S8578, 1 specimen; off Makua, in cave, depth 36.6 m, 19 Aug. 1973, P. Lobel coll., BPBM S8491, S8492, S8493, 3 specimens; Sharks Cove, north shore, in small crevice in side of lava opening, depth 21.3 m, 22 Aug. 1976, G. M. Ludwig coll., BPBM S8579, 1 specimen. HAWAII, Pada Bay, South Kona, 19°14'N lat., 155°55'W long., depth 32 m, 27 June 1976, G. M. Ludwig coll., BPBM S8580.

MAURITIUS: West coast of La Fouche, Medine, in cave, depth 30 m, 19 Nov. 1973, D. Pelicier, J. E. Randall coll., BPBM S8494, 1 specimen; West coast, Cathedral Reef, off Flic en Flac, in cave, depth 30.5 m, 20 Nov. 1973, J. E. Randall, D. Pelicier coll., BPBM S8495, 1 specimen.

Diagnosis.—A moderately large stenopodidean shrimp, with slender, compressed body, generally covered with spinous processes; telson lacking marginal spine; scaphocerite with distal marginal tooth separated from others; with red mid-dorsal abdominal stripe.

Description.—Holotype (male, USNM 173917). Rostrum (Figs. 1, 2A) long, extending past middle of last antennular peduncle segment, directed slightly upwards, gradually tapering to apex. Dorsal margin with 5 strong spines, distal largest, reaching beyond tip. Ventral margin slightly concave proximally with 3 spines distally, numerous proximal setae. Lateral margins with 3 right spines, 4 left spines, carinae poorly developed.

Carapace (Fig. 2A) densely covered with spinules placed in more or less distinct longitudinal rows. Spinules most strongly developed anterodorsally, smallest over lower and posterior branchiostegite, directed anteriorly. Cervical groove distinct with 5 spines along upper margin. Orbit with small but distinct supraorbital spine. Inferior orbital angle bearing large tubercle and large spine. Large antennal spine present, small hepatic spine at lower end of cervical groove. Ventrolateral angle somewhat rounded, only slightly produced anteriorly while posterolateral angle of branchiostegite obtusely angled and slightly concave.

First 3 abdominal somites with similar forwardly directed spinules similar to those on carapace. First somite with 2 irregular transverse rows of spinules, pleuron ending in 1 weak and 2 strong spines. Second somite with 3 transverse rows of spinules. Pleura of second to fifth somite truncate, each ventrolateral margin with 3 strong spines. Third somite (Fig. 2B) broadly produced with no bare shield-shaped area present. Distolaterally directed spinules of fourth somite arranged in 3 somewhat parallel rows, depressed and squamose; those of fifth somite similar but in somewhat less distinct rows. Sixth somite bearing 2 longitudinal rows of 6 large spinules in mesial region, a medial row of 8 smaller spinules, scattered proximal transverse spinules, and additional lateral spines. Each abdominal somite bearing strong ventral median spine. Ventral surface of sixth somite also densely covered with spinules. Length of fifth abdominal somite 0.4 times that of sixth somite which is about 1.5 times longer than its greatest breadth.

Eyes (Fig. 2C) well developed, with peduncle slightly longer than cornea. Ophthalmic peduncle dorsally with 4 small spinules, 3 extending over cornea; proximodorsal side with 4 small spinules, one extending over cornea.

Telson (Fig. 2D) lance-shaped, with median groove flanked by 2 distinct longitudinal carinae. Telson length approximately 1.6 times that of sixth abdominal somite, 2.5 times longer than anterior width of telson. Carinae provided with 8 left, 6 right strong, posteriorly directed spines, some having 1 or 2 long plumose setae at outer basal side. Strong anterior spine present laterally at telson base, with 5 pairs of median spines occurring between each carina and median groove and extending slightly less than half way

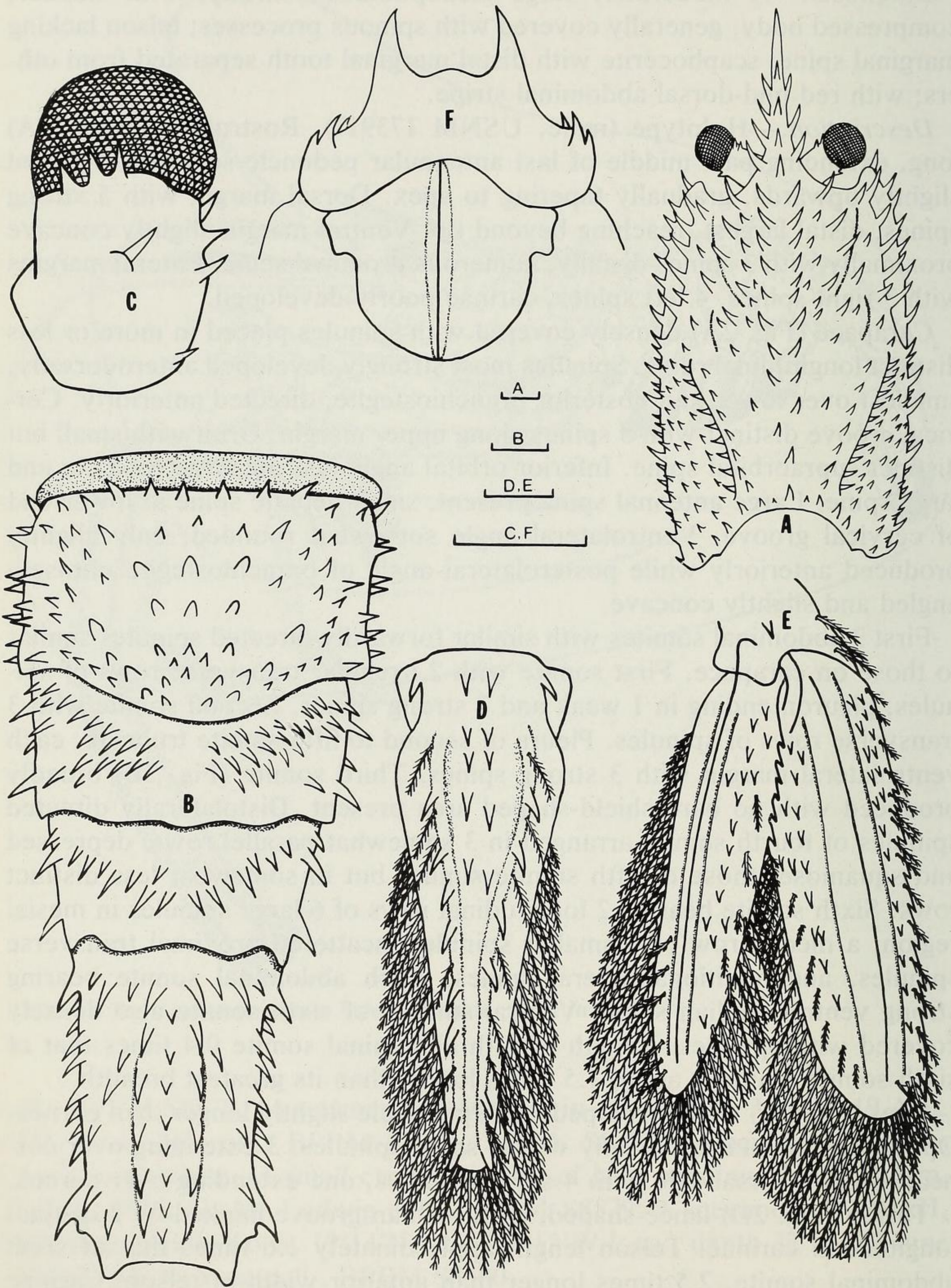


Fig. 2. *Stenopus pyrsonotus*, holotype, male: A, Carapace, dorsal view; B, Third to sixth abdominal somites, dorsal view; C, Left eye, dorsal view; D, Telson; E, Uropods; F, Epistome and labrum, ventral view. Scale bars represent 1.0 mm.

down telson length. Lateral margin lacking spine, provided with 48 long plumose setae along posterior two thirds. Posterior margin rounded, with last 2 longitudinal carinal spines overlapping margin.

Uropods (Fig. 2E) well developed with endopodite exceeding telson tip but narrower and shorter than exopodite. Basal segment stout with single mesial spine, three outer marginal plumose setae. Exopodite bearing nine acute teeth and 16 short plumose setae on outer margin. Dorsal surface bearing distinct median ridge with 2 longitudinal rows of 6, 13 spines outside; 2 longitudinal rows of 4, 9 spines and 7 short plumose setae inside. Outer proximal margin of endopodite bearing 6 teeth, 5 distal short plumose setae. Dorsal surface bearing distinct median ridge with scattered spines, denser proximally, 4 short plumose setae outside; distal row of 6 short plumose setae inside. Unarmed margins of exopodite, endopodite provided with 36, 52 long plumose setae respectively.

Epistome (Fig. 2F) triangular anteriorly with 2 stout submedian spines next to small median rounded area. Three pairs of spines laterally; labrum normally developed. Paragnath (Fig. 3A) bilobed with lobes separated by median fissure terminating in 2 rounded humps. Thoracic sternites narrow with 2 submedian spinules on segments 4–6, 8 submedian spinules on segments 7–8.

Antennular peduncle (Figs. 3B, C) short, extending to middle of scaphocerite. Basal, middle segments about same length, distal segment considerably shorter. Basal segment about twice as long as wide with broad rectangular process on inner dorsobasal margin; small elongate stylocerite on outer margin, tapering to sharp point; inner distodorsal angle produced into prolonged ridge with 3 strong spines, dorsomedially 2 strong spines, 2 small spines and few setae on outer distodorsal angle. Middle segment with 5 spines on ventral margin, 1 distodorsally, 1 spine on inner proximal margin, also 3 large spines extending out dorsally. Distal segment about 0.6 times length of basal segment with 1 spine distodorsally followed by 2 setae at inner distal margin, smaller medial spine ventrally. Upper flagellum well developed with proximal part bearing 29 groups of aesthetascs beginning on tenth article ending on eighteenth. From article 2 to 15, 16 dorsal spines. Lower flagellum not as strongly developed as upper one.

Antenna (Fig. 3D) with strong basal segment bearing 4 large spines. Scaphocerite well developed, reaching about 2.5 times beyond tip of rostrum. Outer margin strongly concave proximally with small basal spine followed by 1 much larger, longer spine and 2 small distal spines; upper part bearing 24 small teeth followed by considerable non-serrate distance up to final large tooth. Dorsal surface bearing 2 distinct longitudinal carinae, inner side of medial carina with row of 33 spinules. Inner margin provided with 69 long plumose setae. Ventral surface with medial longitudinal row of spi-

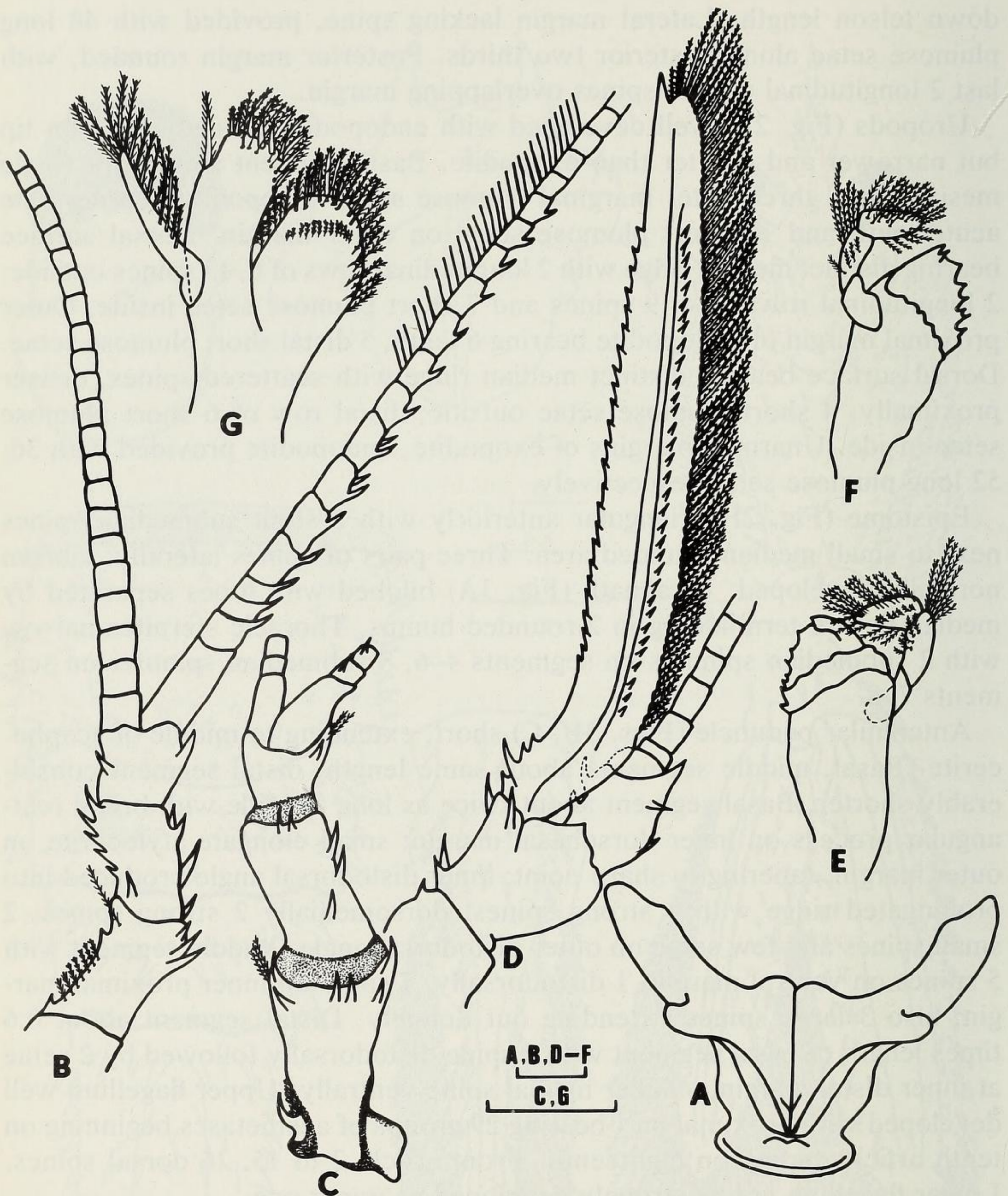


Fig. 3. *Stenopus pyrrsonotus*, holotype, male: A, Paragnath; B, Right antennule and antennular peduncle, ventrolateral view; C, Left antennular peduncle, dorsal view; D, Antenna and scaphocerite, dorsal view; E, Mandible, ventral view; F, Mandible, dorsal view; G, Maxillule. Scale bars represent 1.0 mm.

nules (not shown). Antennal flagellum well developed, extending beyond tip of telson.

Mandible (Figs. 3E, F) robust with short, fused molar and incisor processes. Molar surface with few minute irregular teeth, incisor bearing 9

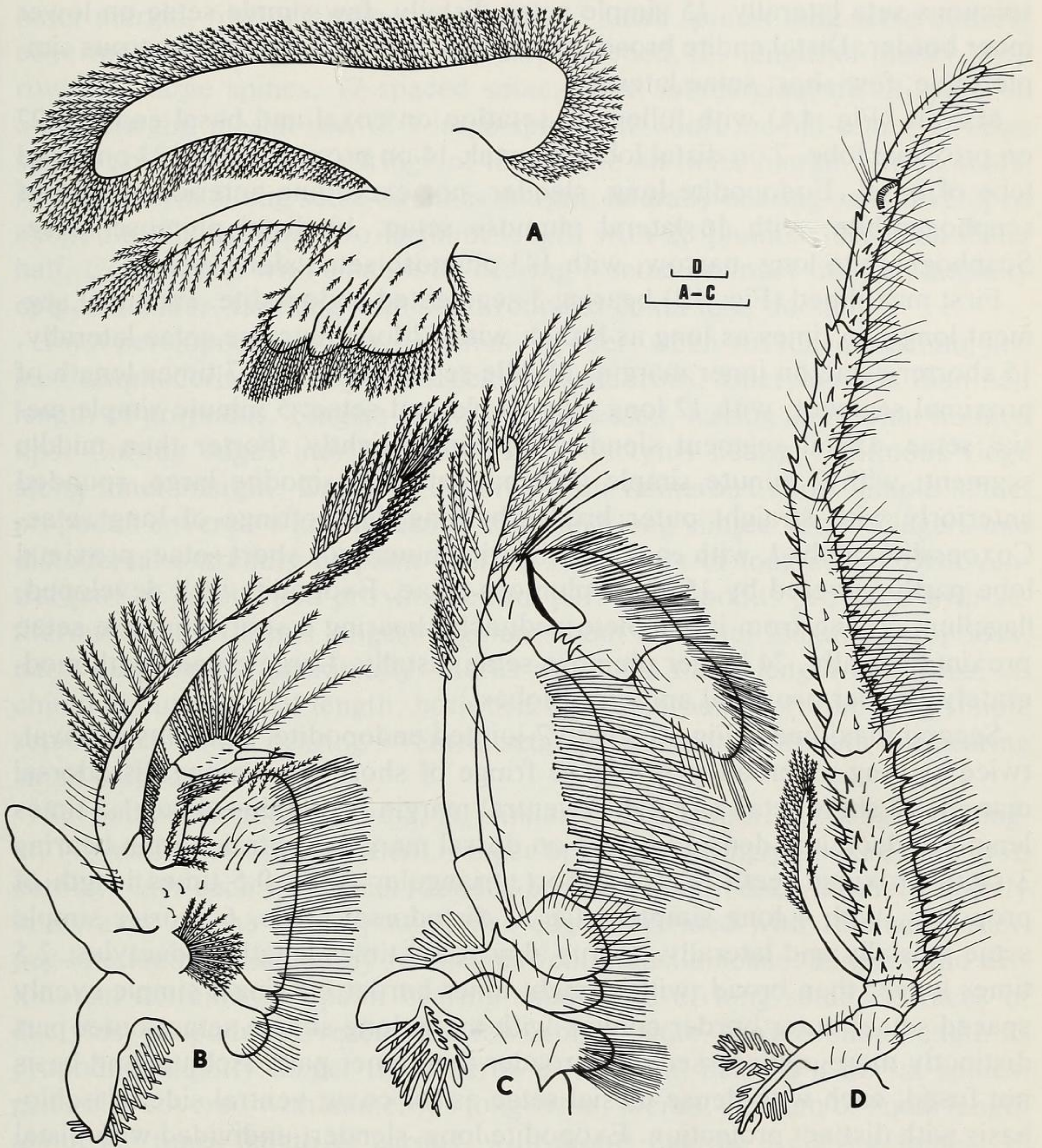


Fig. 4. *Stenopus pyrsonotus*, holotype, male: A, Maxilla; B, First maxilliped; C, Second maxilliped; D, Third maxilliped. Scale bars represent 1.0 mm.

small medial teeth. Palp well developed, 3-segmented. Proximal segment without setae; middle segment about one-third longer than proximal segment bearing 4 small lateral setae, groups of large distal setae; distal segment broad, densely covered with setae laterally and distally.

Maxillule (Fig. 3G) with slender undivided endopodite about 6.5 times longer than broad, bearing 14 plumose setae on lateral border and distally. Proximal endite moderately broad, somewhat truncated distally with con-

spicuous seta laterally, 15 simple setae distally, few simple setae on lower inner border. Distal endite broader, rounded distally, bearing numerous simple setae, few short setae laterally.

Maxilla (Fig. 4A) with following setation on coxal and basal endites: 27 on proximal lobe, 7 on distal lobe of coxal; 14 on proximal lobe, 23 on distal lobe of basal. Endopodite long, slender, not exceeding anterior margin of scaphognathite, with 16 lateral plumose setae, 10 distal plumose setae. Scaphognathite long, narrow, with 143 plumose setae along margin.

First maxilliped (Fig. 4B) bearing 3-segmented endopodite. Proximal segment long, 2.5 times as long as broad, with 12 long plumose setae laterally, 15 shorter setae on inner margin. Middle segment about 0.7 times length of proximal segment, with 12 long plumose lateral setae, 5 minute simple mesial setae. Distal segment slender, tapering, slightly shorter than middle segment, with 2 minute simple terminal setae. Basipodite large, rounded anteriorly with straight outer border bearing dense fringe of long setae. Coxopodite bilobed, with each lobe bearing numerous short setae; proximal lobe partly covered by 15 short plumose setae. Exopodite well developed, flagellum arising from incomplete peduncle, bearing 6 short plumose setae proximomesially, 24 longer plumose setae distally. Large epipod with moderately slender proximal and distal lobes.

Second maxilliped (Fig. 4C) with 7-jointed endopodite. Dactylus suboval, twice as long as broad, with dense fringe of short setae along distodorsal margin, 12 short setae along distoventral margin. Propodus about 1.5 times length of dactylus, densely setose on dorsal margin, ventral margin bearing 3 stout proximal teeth. Carpus short, triangular about 0.5 times length of propodus, with 4 long simple setae at distodorsal angle, 6 shorter simple setae mesially and laterally. Merus almost 2.0 times length of dactylus, 2.5 times longer than broad, with straight inner border bearing 4 simple evenly spaced setae; outer border convex with many long simple setae; outer part distinctly more compressed and broader than inner part. Ischium and basis not fused, each with dense mesial setae as for coxa; ventral side of ischio-basis with distinct projection. Exopodite long, slender, undivided with distal half bearing 23 long plumose setae. Small epipod present.

Third maxilliped (Fig. 4D) endopodite strongly developed, 7-segmented. Dactylus slender, tapering, about 6.5 times longer than basal width, with 14 simple setae on outer margin, 19 simple setae mesially and on inner margin. Propodus same length as dactylus but about 5.0 times longer than broad, bearing 1 acute spine, few long and short simple setae on outer margin; 4 spines medially; setiferous organ distally; numerous long simple setae along inner margin. Carpus slightly longer than propodus, about 4.5 times longer than broad, with 5 spines, 7 long setae on outer margin; row of 5 spines medially; 4 small spines, numerous long simple setae on inner margin. Merus long, slender, 1.5 times longer than carpus, with 9 large spines on ventral

outer margin; row of 8 spines medially; 13 small spines, long setae densely covering inner margin. Ischium robust, flattened, 0.9 length of merus, with row of 7 large spines, 17 spaced setae, large submarginal distal spine on outer margin; mesial row of 9 large spines, 18 short medial setae; 11 large spines covered by dense fringe of long setae on inner margin. Basis short, rounded, with 5 long setae on inner margin, laterally bearing well developed exopodite almost equal to ischium length with 28 plumose setae on distal half. Coxa short, with small lobe bearing 3 setae on inner margin; laterally epipod slender, tapering with solid rounded coxal lobe dorsally.

First pereopod (Figs. 5A, B) small, slender, when stretched reaching just past scaphocerite, all segments generally glabrous. Dactylus less than half length of propodus. Fingers slightly compressed, having somewhat hooked tips. Cutting edges indistinct with only dactylus bearing chitinous ridge along inner margin. Dactylus covered with numerous short simple setae, propodus covered with numerous short and long simple setae. Fingers and distodorsal extremity of palm bearing small tufts of long setae. Distoven-tral part of carpus and proximoventral part of propodus provided with setiferous organ. Carpus longest segment about 1.3 times length of propodus, narrowing slightly proximally. Merus about 0.8 times length of carpus, ischium about of equal length, both bearing numerous short and long simple setae. Basis short, bearing 5 ventral setae; coxa stout, unarmed, but bearing small epipod.

Second pereopod (Figs. 5C, D) similarly built as first, but longer, stronger. No setiferous organ present. Finger tips more strongly hooked than first, cutting edges each with small rounded proximal tooth, dactylar tooth slightly in advance of one on propodus; also edges provided with 18 small, stout, peg-like teeth separated by rectangular chitinous lamellae. Fingers and distodorsal extremity of palm bearing small tufts of long setae, surfaces of dactylus, propodus covered with few simple setae. Carpus same length as propodus, slightly longer than merus or ischium, bearing 8 dorsal spines, generally covered with numerous long setae. Merus, ischium of equal length about 0.7 times length of carpus, with merus bearing 9 curved spines, 16 long setae dorsally; ischium with few long setae. Basis short with 4 ventral setae; coxa stout with small epipod.

Third pereopod (Fig. 5E) largest, strongest, longer than entire length of body, extending beyond scaphocerite by half length of merus and length of carpus and chela. Palm of chela longest segment with dorsal row of 23 strong forward curved spines, below this 15 smaller spines dorsomesially, followed by median groove with 17 similar sized spines. Ventral margin bearing 26 strong forward curved spines, 15 smaller spines ventromesially, less distinct row of 11 small spines on outer side. Between dorsal, ventral marginal spines numerous long simple setae. Fingers elongate, with sharp hooked crossing tips. Dactylus bearing 10 dorsal acute spines, 3 smaller spines dor-

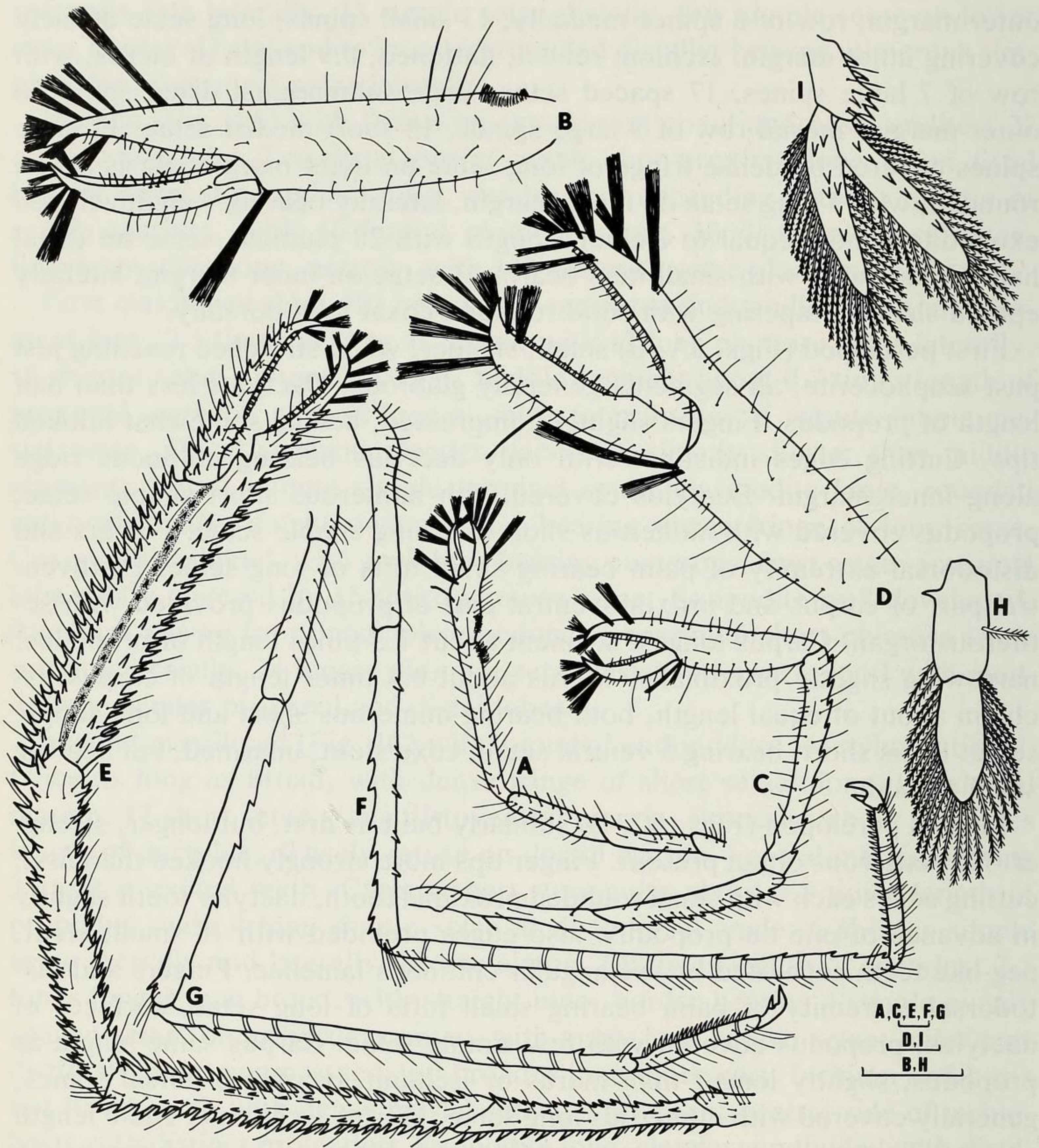


Fig. 5. *Stenopus pyrrsonotus*, holotype, male: A, First pereopod; B, Chela of first pereopod; C, Second pereopod; D, Chela of second pereopod; E, Third pereopod, mesial view; F, Fourth pereopod; G, Fifth pereopod; H, First pleopod; I, Second pleopod. Scale bars represent 1.0 mm.

somesially at proximal end, numerous long simple setae. Dactylar cutting edge bearing 4 small sharply pointed teeth proximally merging into row of 14 stout, peglike teeth separated by rectangular chitinous lamellae. Cutting edge of propodus with large blunt tooth, more acute tooth proximally, opposing 4 small proximal dactylar teeth; also distally bearing 14 peglike teeth separated by chitinous lamellae. Fingers distally bearing small tufts of long

setae. Carpus about 0.3 times shorter than propodus narrowing gradually proximally. Dorso-outer margin bearing 19 spines, 18 smaller spines dorsomesially; ventral margin with 13 spines, less distinct row of 10 small spines ventromesially. Scattered long setae on dorsal, mesial, outer, and ventral margins. Merus almost as long as propodus, narrower than carpus, with dorso-outer row of 19 large spines, 11 smaller spines dorsomesially, 11 large spines on inner side. Ventral margin with 17 large spines, 7 smaller spines ventromesially, 8 spines on outer side. Numerous long setae interspaced between dorsal, ventral marginal spines. Ischium short, about half length of propodus with 14 spines on inner side, 12 spines on ventral margin, 5 ventromesial spines, few short simple setae. Basis and coxa short, fragile with 1 small spine and 5 spines respectively on ventral margins, few short setae, small epipod.

Fourth, fifth pereopods (Figs. 5F, G) long, slender, very similar. Dactylus of fourth biunguiculate with unguis long, curved, not clearly separated from dactylar corpus; accessory spine short, straight, about half length of unguis. Propodus subdivided into 7 segments bearing 25 movable ventral spines, 23 long dorsal setae. Carpus slender, straight, longest segment of pereopod, subdivided into 15 smaller segments with 6 small spines on distoventral margin of distal 7 segments; 29 long, well spaced, unbranched setae. Merus slender, elongate, with 5 ventral spines, 9 dorsal spines, 5 long setae at distodorsal extremity. Ischium, basis unarmed except for few long setae. Coxa ventrally bearing large distal spinule, 2 smaller proximal spinules. Fifth pereopod with similar dactylus as fourth, but unguis not as long with small distal ridge. Propodus subdivided into 5 segments with 20 movable ventral spines, 12 long dorsal setae. Carpus longer than fourth pereopod's, subdivided into 14 segments with 5 small distoventral spines on distal 5 segments, 1 proximal dorsal spine, 16 long dorsal setae. Merus with 5 ventral spines, 1 proximal and distodorsal spine, 4 long setae at distodorsal extremity. Ischium, basis unarmed except for few long setae; coxa bearing 3 ventral spinules.

First pleopod (Fig. 5H) uniramous, second (Fig. 5I) to fifth biramous, all lacking appendices. First pleopod smallest, with exopodite equal in length to basipodite. Dorsal margin of basipodite with single mid-proximal spine, 2 distal plumose setae; ventral margin with median plumose seta. Exopodite bearing 28 plumose marginal setae. Rami of second pleopod about twice length of basipodite. Ventral margin of basipodite bearing 5 spines, 4 simple setae; 1 spine ventromesially. Ventral surface of exopodite bearing row of 6 spines, 30 plumose marginal setae; that of endopodite with 8 spines, 36 plumose marginal setae. Third to fifth pleopods generally similar, decreasing in size, spinulation posteriorly.

Branchial formula:

	Maxillipeds			Pereiopods				
	I	II	III	I	II	III	IV	V
Pleurobranchs	—	1	1	1	1	1	1	1
Arthrobranchs	—	1	2	2	2	2	2	—
Podobranchs	—	1	—	—	—	—	—	—
Epipods	1	1	1	1	1	1	1	—
Exopods	1	1	1	—	—	—	—	—

Measurements: The measurements of the holotype are included in Table 1 and compared with other specimens examined.

Coloration: The carapace, eyestalk, antennular peduncle, antennal scale, and rostrum are a pinkish-white. The antennal flagella are all completely opaque white. The third maxillipeds are a translucent pink. The coxae, basises, ischia and meri are translucent pink on all the pereiopods, and the rest of these appendages are opaque white. The abdomen is largely white except for a red central stripe covering about one third of the dorsal surface and extending from the first abdominal somite to the sixth somite (often with a very narrow central white portion) becoming broader by the third abdominal somite. The telson is white and the uropods are a translucent pink.

Allotype: (female, USNM 173918). Generally similar to holotype, but differing in the following respects. The rostrum has 7 dorsal, 2 ventral, 3 left lateral, and 4 right lateral teeth. The telson's longitudinal carinae each bearing 7 strong spines. The mouthparts were removed from the right side, but show no major differences. The dactylar cutting edge of the third pereiopod has the 4 proximal teeth coalesced into one large sharp tooth. There are no ventral median spines present on the abdominal somites. The first pleopod is not shorter relative to the rest and the exopodite is narrow and acuminate, longer than the basipodite, which lacks the proximal spine on its outer margin.

Paratypes: The new species is variable in the number of body and appendage spines. For example, our specimens showed the rostrum with from 5–7 dorsal, 1–7 ventral, and 0–4 lateral spines (Fig. 6). The number of spines on the proximal part of the outer margin of the scaphocerite in our material varies from 2 to 4, while the number on the distal part varies from 15 to 30. The third maxilliped sometimes has a small spine proximal to the setiferous organ. The first and second pereiopods sometimes have short proximal spinules on their ischia and basises. Some specimens have minute peglike teeth separated by chitinous lamellae on the cutting edge of the first pereiopod. The basipodite of the first pleopod has 0–3 spines. We could not find any correlation between the number of spines and the size or sex of the animals, but some of these differences probably reflect allometric growth changes and the normal variation in the species. Some specimens have the carapace and proximal parts of the walking legs tan or light golden brown.

Table 1.—Meristic data and correlation between carapace, third pereiopod, and total length in *Stenopus pyronotus* sp. nov. (measurements in mm).

Specimen	*										**				
	BPBM S8580	BPBM S8287	BPBM S8578	BPBM S8494	BPBM S8577	USNM 173917	USNM 173919	BPBM S8579	BPBM S7887a	BPBM S8493b	USNM 173918	BPBM S8491	BPBM S7887b	BPBM S8493a	BPBM S8495
(1) Total length	28.2	30.0	30.0	34.0	41.5	47.0	48.7	51.5	52.5	52.5	53.0	58.0	59.0	62.0	73.0
(2) Rostral carapace length	10.0	10.7	11.3	12.0	14.5	15.0	15.5	15.5	21.0	19.0	18.0	20.0	21.5	21.0	29.0
(3) Post-orbital carapace length	6.0	6.5	7.1	8.0	9.0	10.0	10.5	8.5	14.5	13.2	12.2	12.2	14.5	15.0	21.0
(4) Third pereiopod dactylus length	3.9	4.4	5.0	5.2	9.0	8.0	7.2	10.0	10.0	11.5	7.5	12.0	15.0	11.0	14.0
(5) Third pereiopod propodus length	12.0	13.0	13.5	17.0	24.0	19.3	19.2	21.5	24.0	29.0	20.0	29.3	39.0	37.0	50.0
(6) Third pereiopod carpus length	9.8	9.5	9.5	11.0	15.0	13.5	13.6	—	15.0	16.0	12.0	19.2	20.0	20.0	24.0
(7) Third pereiopod merus length	11.0	11.0	10.0	14.0	16.2	12.0	13.0	18.5	18.0	19.0	14.3	20.0	23.5	22.0	34.0
(8) Third pereiopod ischium length	7.0	7.0	7.1	9.0	12.0	10.0	9.5	13.0	13.5	14.0	10.8	12.5	—	15.5	18.0
(9) Third pereiopod total length (5-8)	39.8	40.5	40.1	51.0	67.2	54.8	55.3	—	70.5	78.0	57.1	81.0	—	94.5	126.0
Ratio (9)/(3)	6.6:1	6.2:1	5.6:1	6.4:1	7.5:1	5.5:1	5.3:1	—	4.9:1	5.9:1	4.7:1	6.6:1	—	6.3:1	6.1:1
Ratio (9)/(2)	4.0:1	3.8:1	3.5:1	4.3:1	4.6:1	3.7:1	3.6:1	—	3.4:1	4.1:1	4.7:1	4.1:1	—	4.5:1	4.3:1
Ratio (9)/(1)	1.4:1	1.4:1	1.3:1	1.5:1	1.6:1	1.2:1	1.1:1	—	1.3:1	1.5:1	1.1:1	1.4:1	—	1.5:1	1.7:1
Ratio (1)/(2)	2.8:1	2.8:1	2.7:1	2.8:1	2.9:1	3.1:1	3.1:1	3.3:1	2.5:1	2.8:1	4.3:1	2.9:1	2.7:1	3.0:1	2.5:1

* Holotype. ** Allotype.

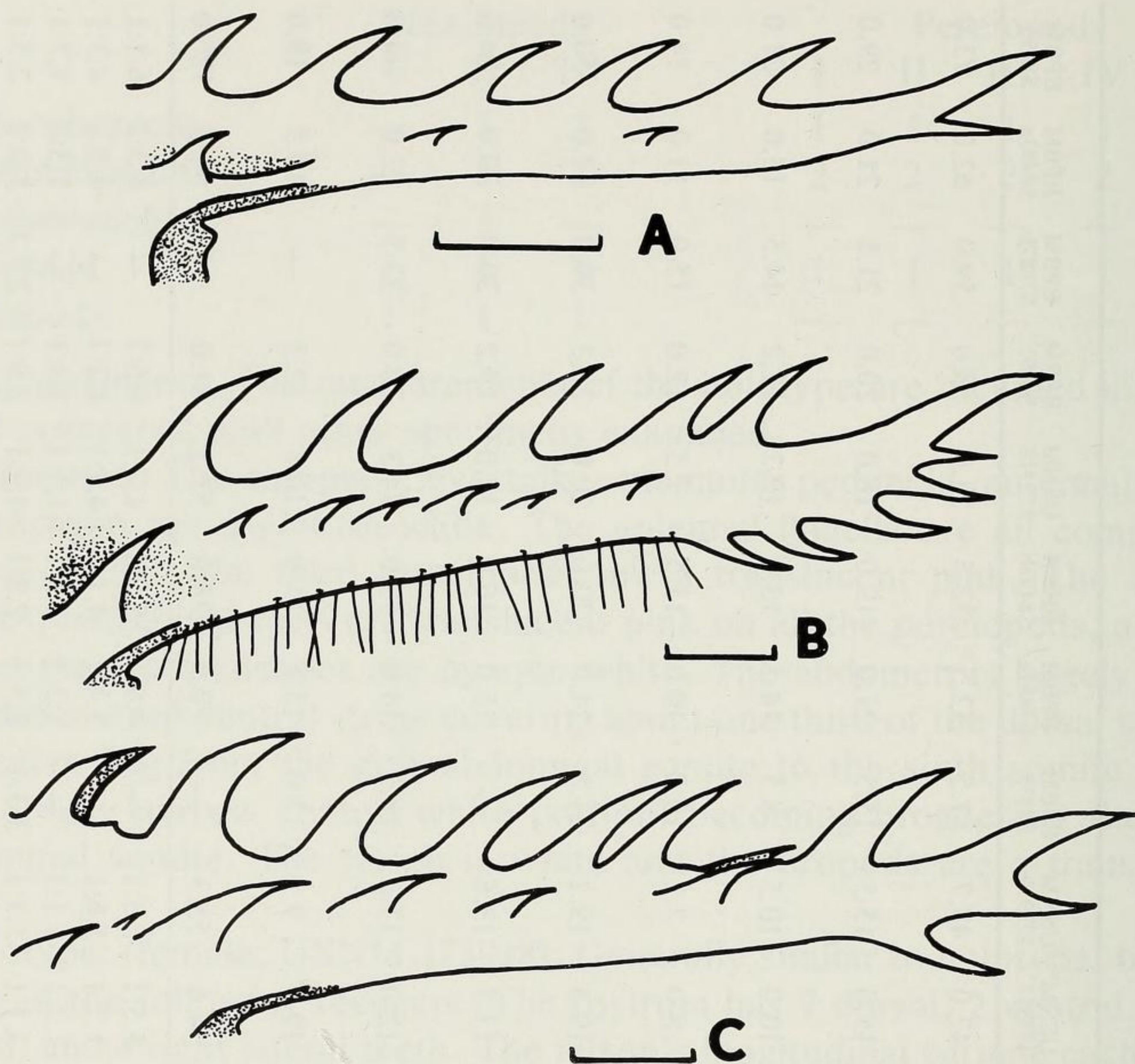


Fig. 6. *Stenopus pyrrsonotus*, paratypes: A, Rostrum BPBM S8577; B, Rostrum BPBM S7887; C, Rostrum BPBM S8491. Scale bars represent 1.0 mm.

A large ovigerous specimen (BPBM S8493) has a medial ventral abdominal spine present on each segment except the sixth which bears 2 spines. A juvenile character of the new species is the absence of pleopods on the first abdominal segment in specimens with rostral carapace length less than 11 mm or post-orbital carapace length less than 7 mm (BPBM S8287, S8580).

Type locality.—Hawaiian Islands, Oahu, west coast off Pokai Bay.

Habitat.—Most of the specimens were taken in crevices, caves, or under ledges on well developed coral reef systems. This cryptic behavior is also exhibited by other members of the genus. In at least 2 observations, the new species was found with a large green-bordered moray eel, *Gymnothorax flavimarginatus*. The specimen from Pada Bay, a juvenile, was one example seen with an eel, but other large specimens were also said to have been seen with this eel species (G. M. Ludwig, written communication). These observations and the fact that these shrimp have long prominent white antennal flagella, may indicate that the new species enters into cleaning symbiosis with cooperating fish, much like its congener, *Stenopus hispidus*.

Etymology.—The specific name is derived from the Greek “pyrsonotos” meaning red-backed; it is given because of the distinctive deep red stripe on the dorsal surface of the abdomen.

Remarks.—The new species, *Stenopus pyrsonotus*, follows closely the definition of the genus *Stenopus* Latreille given by Holthuis (1946), only differing in the absence of the lateral spines on the telson. This character separates it from all other species in the genus. It is most closely related to *S. hispidus*, but differs in color, rostrum, telson and the body spines being less erect.

Key to the Described Indo-West Pacific
Species of *Stenopus*

1. Lateral marginal spines absent on telson; abdominal somites with broad mid-dorsal red stripe *S. pyrsonotus* sp. nov.
- Lateral marginal spines present on telson; abdominal somites otherwise pigmented 2
2. Outer margin of scaphocerite serrate up to final (terminal) tooth; abdomen with oval red patches on lateral sides of second and fifth somites *S. zanzibaricus* Bruce, 1976
- Outer margin of scaphocerite with considerable nonserrate space before final (terminal) tooth; abdomen otherwise pigmented 3
3. Rostrum exceeding antennular peduncle in length, with 2–9 ventral spines; abdomen with red transverse bands on third and fifth somites *S. tenuirostris* De Man, 1888
- Rostrum not exceeding middle segment of antennular peduncle in length, without ventral spines; abdomen with red transverse bands on third and sixth somites *S. hispidus* (Olivier, 1811)

Two species of stenopodidean shrimp have so far been reported from the Hawaiian Islands, *Stenopus hispidus* (Rathbun, 1906; McNeill and Ward, 1930; Edmondson, 1946; Tinker, 1965; Hobson and Chave, 1972; Titcomb *et al.*, 1979) and *Spongicola henshawi* (Rathbun, 1906). *Stenopus hispidus* has also been recorded from Mauritius (White, 1847; Hoffmann, 1874) along with many Indo-Pacific and Western Atlantic records reported by Holthuis (1946). The only other stenopodidean shrimp recorded from Mauritius belong to the genus *Microprosthemma*. Richters (1880) reported *Microprosthemma validum*, *M. scabricaudatum* and *M. plumicorne* from Île aux Fouquets, Mauritius. *Stenopus tenuirostris* is moderately common on western Indian Ocean reefs according to Bruce (1976). It has also been reported from numerous Indonesian localities (Holthuis, 1946), the Seychelles and Coetivy Islands (Borradaile, 1910), the Solomon Islands (Yaldwyn, 1968) and New Caledonia (Monod, 1976). *Stenopus zanzibaricus* was reported on the basis of a single specimen taken from Mwemba Island off Zanzibar (Bruce, 1976), but one of us (JWG) has examined another small male (total length 19.0 mm) collected from Canton Island (USNM 181402).

A specimen of yet another new species of *Stenopus* was recently collected off Makua, Oahu. This was an ovigerous female (total length approx. 24 mm) that differs in coloration and numerous morphological characters from *S. hispidus* and *S. pyrsonotus*. Preliminary comparison with other descriptions indicates a closer relationship to the Western Atlantic *S. scutellatus*, and a full description will be presented in a forthcoming publication.

Acknowledgments

We are grateful to Dr. John E. Randall, of the Bernice P. Bishop Museum, who made it possible to examine several specimens of *Stenopus pyrsonotus* he collected and for providing the photograph of the new species taken off the west coast of Oahu.

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(JWG) Duke University Marine Laboratory, Pivers Island, Beaufort, North Carolina 28516; (DMD) Bernice P. Bishop Museum, Department of Zoology, P.O. Box 19000-A, Honolulu, Hawaii 96819.

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STENOPUS PYRSONOTUS, A NEW SPECIES OF

STENOPODIDEAN SHRIMP FROM THE INDO-WEST

PACIFIC REGION (CRUSTACEA: DECAPODA)

Joseph W. Goy and Dennis M. Devaney

Abstract. — A new species of shrimp in the genus *Stenopus* from the Indo-West Pacific region is described and figured. Specimens have been collected from the Hawaiian Islands and Mauritius. The new species, *Stenopus pyrsonotus*, is closely related to *S. hispidus* but is easily distinguished by morphological differences in the rostrum, telson, and spinulation of the body as well as by coloration. A key to the 4 described species from the Indo-West Pacific is included.

Three of the 5 previously reported species of *Stenopus* are found in the Indo-West Pacific region. *Stenopus hispidus* has a circumtropical distribution (Holthuis, 1946), *S. tenuirostris* is known from the Indian Ocean and Malay Archipelago (Bruce, 1976), and *S. zanzibaricus* was recently described from off the coast of Zanzibar (Bruce, 1976). Collections over sev-

eral years at Mauritius and in the Hawaiian Islands have provided some interesting specimens of a *Stenopus* that show a striking color pattern differing markedly from the other three Indo-West Pacific species. Besides this distinctive coloration, morphological characters distinguish the specimens from the other species in the genus. They are described here as representing a new species. Specimens recorded herein are deposited in the Bernice P. Bishop Museum (BPBM), Honolulu and the National Museum of Natural History (USNM), Washington, D.C. All material recorded below is considered in the type-series.

Stenopus pyrsonotus, sp. nov.

Figs. 1-6

Material examined.— RA¹ MIK¹ ISLANDS: OAHU, off Pokai Bay, depth 22.9 m, 13 July 1975, G. Fukuda coll., USNM 173917 (Holotype), USNM 173918 (Allotype), USNM 173919 (Paratype); off Pokai Bay, depth 24.4 m, 29 July 1969, J. E. Randall, S. Swerdloff and D. Chave coll., BPBM S8577, 1 specimen; off Lahilahi Point, in cave, depth 27.4 m, 11 July 1970, J. E. Randall coll., BPBM S8287, 1 specimen; 14 mile east of Manana Islet (Rabbit Island), from bilge tank of sunken boat, depth 68 m, 14 Oct. 1970, coll. W. D. Madden et al., BPBM S7887, 3 specimens; south of Pokai Bay, depth 22.9 m, under ledge along reef outcrop, 14 Dec. 1972, D. M. Devaney

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Fig. L *Stenopus pyrrsonotus*, holotype, male. Scale in mm.

coll., BPBM S8578, 1 specimen; off Makua, in cave, depth 36.6 m, 19 Aug. 1973, P. Lobel coll., BPBM S8491, S8492, S8493, 3 specimens; Sharks Cove, north shore, in small crevice in side of lava opening, depth 21.3 m, 22 Aug. 1976, G. M. Ludwig coll., BPBM S8579, 1 specimen. HAWAII, Pada Bay, South Kona, 19°14'N lat., 155°55'W long., depth 32 m, 27 June 1976, G. M. Ludwig coll., BPBM S8580.

MAURITIUS: West coast of La Fouche, Medine, in cave, depth 30 m,

19 Nov. 1973, D. Pelicier, J. E. Randall coll., BPBM S8494, 1 specimen;

West coast. Cathedral Reef, off Flic en Flac, in cave, depth 30.5 m, 20 Nov.

1973, J. E. Randall, D. Pelicier coll., BPBM S8495, 1 specimen.

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Diagnosis. — A moderately large stenopodidean shrimp, with slender, compressed body, generally covered with spinous processes; telson lacking marginal spine; scaphocerite with distal marginal tooth separated from others; with red mid-dorsal abdominal stripe.

Description.— *IloXoiyi*^Q (male, USNM 173917). Rostrum (Figs. 1, 2A) long, extending past middle of last antennular peduncle segment, directed slightly upwards, gradually tapering to apex. Dorsal margin with 5 strong spines, distal largest, reaching beyond tip. Ventral margin slightly concave proximally with 3 spines distally, numerous proximal setae. Lateral margins with 3 right spines, 4 left spines, carinae poorly developed.

Carapace (Fig. 2A) densely covered with spinules placed in more or less distinct longitudinal rows. Spinules most strongly developed anterodorsally, smallest over lower and posterior branchiostegite, directed anteriorly. Cervical groove distinct with 5 spines along upper margin. Orbit with small but distinct supraorbital spine. Inferior orbital angle bearing large tubercle and large spine. Large antennal spine present, small hepatic spine at lower end of cervical groove. Ventrolateral angle somewhat rounded, only ' slightly

produced anteriorly while posterolateral angle of branchiostegite obtusely angled and slightly concave.

First 3 abdominal somites with similar forwardly directed spinules similar to those on carapace. First somite with 2 irregular transverse rows of spinules, pleuron ending in 1 weak and 2 strong spines. Second somite with 3 transverse rows of spinules. Pleura of second to fifth somite truncate, each ventrolateral margin with 3 strong spines. Third somite (Fig. 2B) broadly produced with no bare shield-shaped area present. Distolaterally directed spinules of fourth somite arranged in 3 somewhat parallel rows, depressed and squamose; those of fifth somite similar but in somewhat less distinct rows. Sixth somite bearing 2 longitudinal rows of 6 large spinules in mesial region, a medial row of 8 smaller spinules, scattered proximal transverse spinules, and additional lateral spines. Each abdominal somite bearing strong ventral median spine. Ventral surface of sixth somite also densely covered with spinules. Length of fifth abdominal somite 0.4 times that of sixth somite which is about 1.5 times longer than its greatest breadth.

Eyes (Fig. 2C) well developed, with peduncle slightly longer than cornea. Ophthalmic peduncle dorsally with 4 small spinules, 3 extending over cornea; proximodorsal side with 4 small spinules, one extending over cornea.

Telson (Fig. 2D) lance-shaped, with median groove flanked by 2 distinct longitudinal carinae. Telson length approximately 1.6 times that of sixth abdominal somite, 2.5 times longer than anterior width of telson. Carinae provided with 8 left, 6 right strong, posteriorly directed spines, some having 1 or 2 long plumose setae at outer basal side. Strong anterior spine present laterally at telson base, with 5 pairs of median spines occurring between each carina and median groove and extending slightly less than half way

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Fig. 2. *Stenopus pyrsonotus*, holotype, male: A, Carapace, dorsal view; B, Third to sixth abdominal somites, dorsal view; C, Left eye, dorsal view; D, Telson; E, Uropods; F, Epistome and labrum, ventral view. Scale bars represent 1.0 mm.

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down telson length. Lateral margin lacking spine, provided with 48 long plumose setae along posterior two thirds. Posterior margin rounded, with last 2 longitudinal carinal spines overlapping margin.

Uropods (Fig. 2E) well developed with endopodite exceeding telson tip but narrower and shorter than exopodite. Basal segment stout with single mesial spine, three outer marginal plumose setae. Exopodite bearing nine acute teeth and 16 short plumose setae on outer margin. Dorsal surface bearing distinct median ridge with 2 longitudinal rows of 6, 13 spines outside; 2 longitudinal rows of 4, 9 spines and 7 short plumose setae inside. Outer

proximal margin of endopodite bearing 6 teeth, 5 distal short plumose setae. Dorsal surface bearing distinct median ridge with scattered spines, denser proximally, 4 short plumose setae outside; distal row of 6 short plumose setae inside. Unarmed margins of exopodite, endopodite provided with 36, 52 long plumose setae respectively.

Epistome (Fig. 2F) triangular anteriorly with 2 stout submedian spines next to small median rounded area. Three pairs of spines laterally; labrum normally developed. Paragnath (Fig. 3A) bilobed with lobes separated by median fissure terminating in 2 rounded humps. Thoracic sternites narrow with 2 submedian spinules on segments 4-6, 8 submedian spinules on segments 7-8.

Antennular peduncle (Figs. 3B, C) short, extending to middle of scaphocerite. Basal, middle segments about same length, distal segment considerably shorter. Basal segment about twice as long as wide with broad rectangular process on inner dorsobasal margin; small elongate stylocerite on outer margin, tapering to sharp point; inner distodorsal angle produced into prolonged ridge with 3 strong spines, dorsomedially 2 strong spines, 2 small spines and few setae on outer distodorsal angle. Middle segment with 5 spines on ventral margin, 1 distodorsally, 1 spine on inner proximal margin, also 3 large spines extending out dorsally. Distal segment about 0.6 times length of basal segment with 1 spine distodorsally followed by 2 setae at inner distal margin, smaller medial spine ventrally. Upper flagellum well developed with proximal part bearing 29 groups of aesthetascs beginning on tenth article ending on eighteenth. From article 2 to 15, 16 dorsal spines. Lower flagellum not as strongly developed as upper one.

Antenna (Fig. 3D) with strong basal segment bearing 4 large spines.

Scaphocerite well developed, reaching about 2.5 times beyond tip of rostrum. Outer margin strongly concave proximally with small basal spine followed by 1 much larger, longer spine and 2 small distal spines; upper part bearing 24 small teeth followed by considerable non-serrate distance up to final large tooth. Dorsal surface bearing 2 distinct longitudinal carinae, inner side of medial carina with row of 33 spinules. Inner margin provided with 69 long plumose setae. Ventral surface with medial longitudinal row of spi-

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Fig. 3. *Stenopus pyronotus*, holotype, male: A, Paragnath; B, Right antennule and antennular peduncle, ventrolateral view; C, Left antennular peduncle, dorsal view; D, Antenna and scaphocerite, dorsal view; E, Mandible, ventral view; F, Mandible, dorsal view; G, Maxillule. Scale bars represent 1.0 mm.

nules (not shown). Antennal flagellum well developed, extending beyond tip of telson.

Mandible (Figs. 3E, F) robust with short, fused molar and incisor processes. Molar surface with few minute irregular teeth, incisor bearing 9

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Fig. 4. *Stenopus pyronotus*, holotype, male: A, Maxilla; B, First maxilliped; C, Second maxilliped; D, Third maxilliped. Scale bars represent 1.0 mm.

small medial teeth. Palp well developed, 3-segmented. Proximal segment without setae; middle segment about one-third longer than proximal segment bearing 4 small lateral setae, groups of large distal setae; distal segment broad, densely covered with setae laterally and distally.

Maxillule (Fig. 3G) with slender undivided endopodite about 6.5 times longer than broad, bearing 14 plumose setae on lateral border and distally. Proximal endite moderately broad, somewhat truncated distally with con-

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spicuous seta laterally, 15 simple setae distally, few simple setae on lower inner border. Distal endite broader, rounded distally, bearing numerous simple setae, few short setae laterally.

Maxilla (Fig. 4A) with following setation on coxal and basal endites: 27

on proximal lobe, 7 on distal lobe of coxal; 14 on proximal lobe, 23 on distal lobe of basal. Endopodite long, slender, not exceeding anterior margin of scaphognathite, with 16 lateral plumose setae, 10 distal plumose setae. Scaphognathite long, narrow, with 143 plumose setae along margin.

First maxilliped (Fig. 4B) bearing 3-segmented endopodite. Proximal segment long, 2.5 times as long as broad, with 12 long plumose setae laterally, 15 shorter setae on inner margin. Middle segment about 0.7 times length of proximal segment, with 12 long plumose lateral setae, 5 minute simple mesial setae. Distal segment slender, tapering, slightly shorter than middle segment, with 2 minute simple terminal setae. Basipodite large, rounded anteriorly with straight outer border bearing dense fringe of long setae.

Coxopodite bilobed, with each lobe bearing numerous short setae; proximal lobe partly covered by 15 short plumose setae. Exopodite well developed, flagellum arising from incomplete peduncle, bearing 6 short plumose setae proximomesially, 24 longer plumose setae distally. Large epipod with moderately slender proximal and distal lobes.

Second maxilliped (Fig. 4C) with 7-jointed endopodite. Dactylus suboval, twice as long as broad, with dense fringe of short setae along distodorsal margin, 12 short setae along distoventral margin. Propodus about 1.5 times length of dactylus, densely setose on dorsal margin, ventral margin bearing 3 stout proximal teeth. Carpus short, triangular about 0.5 times length of propodus, with 4 long simple setae at distodorsal angle, 6 shorter simple setae mesially and laterally. Merus almost 2.0 times length of dactylus, 2.5 times longer than broad, with straight inner border bearing 4 simple evenly spaced setae; outer border convex with many long simple setae; outer part distinctly more compressed and broader than inner part. Ischium and basis

not fused, each with dense mesial setae as for coxa; ventral side of ischio-basis with distinct projection. Exopodite long, slender, undivided with distal half bearing 23 long plumose setae. Small epipod present.

Third maxilliped (Fig. 4D) endopodite strongly developed, 7-segmented.

Dactylus slender, tapering, about 6.5 times longer than basal width, with 14 simple setae on outer margin, 19 simple setae mesially and on inner margin.

Propodus same length as dactylus but about 5.0 times longer than broad, bearing 1 acute spine, few long and short simple setae on outer margin; 4 spines medially; setiferous organ distally; numerous long simple setae along inner margin. Carpus slightly longer than propodus, about 4.5 times longer than broad, with 5 spines, 7 long setae on outer margin; row of 5 spines medially; 4 small spines, numerous long simple setae on inner margin. Merus long, slender, 1.5 times longer than carpus, with 9 large spines on ventral

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outer margin; row of 8 spines medially; 13 small spines, long setae densely covering inner margin. Ischium robust, flattened, 0.9 length of merus, with row of 7 large spines, 17 spaced setae, large submarginal distal spine on outer margin; mesial row of 9 large spines, 18 short medial setae; 11 large spines covered by dense fringe of long setae on inner margin. Basis short, rounded, with 5 long setae on inner margin, laterally bearing well developed exopodite almost equal to ischium length with 28 plumose setae on distal half. Coxa short, with small lobe bearing 3 setae on inner margin; laterally

epipod slender, tapering with solid rounded coxal lobe dorsally.

First pereiopod (Figs. 5A, B) small, slender, when stretched reaching just past scaphocerite, all segments generally glabrous, Dactylus less than half length of propodus. Fingers slightly compressed, having somewhat hooked tips. Cutting edges indistinct with only dactylus bearing chitinous ridge along inner margin. Dactylus covered with numerous short simple setae, propodus covered with numerous short and long simple setae. Fingers and distodorsal extremity of palm bearing small tufts of long setae. Distoven-tral part of carpus and proximoventral part of propodus provided with se-tiferous organ. Carpus longest segment about 1.3 times length of propodus, narrowing slightly proximally. Merus about 0.8 times length of carpus, is-chium about of equal length, both bearing numerous short and long simple setae. Basis short, bearing 5 ventral setae; coxa stout, unarmed, but bearing small epipod.

Second pereiopod (Figs. 5C, D) similarly built as first, but longer, strong-er. No setiferous organ present. Finger tips more strongly hooked than first, cutting edges each with small rounded proximal tooth, dactylar tooth slightly in advance of one on propodus; also edges provided with 18 small, stout, peg-like teeth separated by rectangular chitinous lamellae. Fingers and dis-todorsal extremity of palm bearing small tufts of long setae, surfaces of dactylus, propodus covered with few simple setae. Carpus same length as propodus, slightly longer than merus or ischium, bearing 8 dorsal spines, generally covered with numerous long setae. Merus, ischium of equal length about 0.7 times length of carpus, with merus bearing 9 curved spines, 16 long setae dorsally; ischium with few long setae. Basis short with 4 ventral setae; coxa stout with small epipod.

Third pereiopod (Fig. 5E) largest, strongest, longer than entire length of body, extending beyond scaphocerite by half length of merus and length of carpus and chela. Palm of chela longest segment with dorsal row of 23 strong forward curved spines, below this 15 smaller spines dorsomesially, followed by median groove with 17 similar sized spines. Ventral margin bearing 26 strong forward curved spines, 15 smaller spines ventromesially, less distinct row of 11 small spines on outer side. Between dorsal, ventral marginal spines numerous long simple setae. Fingers elongate, with sharp hooked crossing tips. Dactylus bearing 10 dorsal acute spines, 3 smaller spines dor-

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Fig. 5. *Stenopus pyrsonotus*, holotype, male: A, First pereiopod; B, Chela of first pereiopod; C, Second pereiopod; D, Chela of second pereiopod; E, Third pereiopod, mesial view; F, Fourth pereiopod; G, Fifth pereiopod; H, First pleopod; I, Second pleopod. Scale bars represent 1.0 mm.

somesially at proximal end, numerous long simple setae. Dactylar cutting edge bearing 4 small sharply pointed teeth proximally merging into row of 14 stout, peglike teeth separated by rectangular chitinous lamellae. Cutting edge of propodus with large blunt tooth, more acute tooth proximally, opposing 4 small proximal dactylar teeth; also distally bearing 14 peglike teeth separated by chitinous lamellae. Fingers distally bearing small tufts of long

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setae. Carpus about 0.3 times shorter than propodus narrowing gradually proximally. Dorso-outer margin bearing 19 spines, 18 smaller spines dorsomesially; ventral margin with 13 spines, less distinct row of 10 small spines ventromesially. Scattered long setae on dorsal, mesial, outer, and ventral margins. Merus almost as long as propodus, narrower than carpus, with dorso-outer row of 19 large spines, 11 smaller spines dorsomesially, 11 large spines on inner side. Ventral margin with 17 large spines, 7 smaller spines ventromesially, 8 spines on outer side. Numerous long setae interspaced between dorsal, ventral marginal spines. Ischium short, about half length of propodus with 14 spines on inner side, 12 spines on ventral margin, 5 ventromesial spines, few short simple setae. Basis and coxa short, fragile with 1 small spine and 5 spines respectively on ventral margins, few short setae, small epipod.

Fourth, fifth pereopods (Figs. 5F, G) long, slender, very similar. Dactylus of fourth biunguiculate with unguis long, curved, not clearly separated from dactylar corpus; accessory spine short, straight, about half length of unguis. Propodus subdivided into 7 segments bearing 25 movable ventral spines, 23 long dorsal setae. Carpus slender, straight, longest segment of pereopod, subdivided into 15 smaller segments with 6 small spines on distoventral margin of distal 7 segments; 29 long, well spaced, unbranched setae. Merus

slender, elongate, with 5 ventral spines, 9 dorsal spines, 5 long setae at distodorsal extremity. Ischium, basis unarmed except for few long setae. Coxa ventrally bearing large distal spinule, 2 smaller proximal spinules. Fifth pereopod with similar dactylus as fourth, but unguis not as long with small distal ridge. Propodus subdivided into 5 segments with 20 movable ventral spines, 12 long dorsal setae. Carpus longer than fourth pereopod's, subdivided into 14 segments with 5 small distoventral spines on distal 5 segments, 1 proximal dorsal spine, 16 long dorsal setae. Merus with 5 ventral spines, 1 proximal and distodorsal spine, 4 long setae at distodorsal extremity. Ischium, basis unarmed except for few long setae; coxa bearing 3 ventral spinules.

First pleopod (Fig. 5H) uniramous, second (Fig. 5I) to fifth biramous, all lacking appendices. First pleopod smallest, with exopodite equal in length to basipodite. Dorsal margin of basipodite with single mid-proximal spine,

2 distal plumose setae; ventral margin with median plumose seta. Exopodite bearing 28 plumose marginal setae. Rami of second pleopod about twice length of basipodite. Ventral margin of basipodite bearing 5 spines, 4 simple setae; 1 spine ventromesially. Ventral surface of exopodite bearing row of 6 spines, 30 plumose marginal setae; that of endopodite with 8 spines, 36 plumose marginal setae. Third to fifth pleopods generally similar, decreasing in size, spinulation posteriorly.

Branchial formula;

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I

Maxillipeds

Pereiopods

I

II

III

I

II

III IV

V

Pleurobranchs

1

1

1

1 1

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Arthrobranchs

2

2

2

2 2

Podobranchs

Epipods

1

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1 1

Exopods

1

1

Measurements: The measurements of the holotype are included in Table 1 and compared with other specimens examined.

Coloration: The carapace, eyestalk, antennular peduncle, antennal scale, and rostrum are a pinkish-white. The antennal flagella are all completely opaque white. The third maxillipeds are a translucent pink. The coxae, basises, ischia and meri are translucent pink on all the pereopods, and the rest of these appendages are opaque white. The abdomen is largely white except for a red central stripe covering about one third of the dorsal surface and extending from the first abdominal somite to the sixth somite (often with a very narrow central white portion) becoming broader by the third abdominal somite. The telson is white and the uropods are a translucent pink.

Allotype: (female, USNM 173918). Generally similar to holotype, but differing in the following respects. The rostrum has 7 dorsal, 2 ventral, 3 left lateral, and 4 right lateral teeth. The telson's longitudinal carinae each bearing 7 strong spines. The mouthparts were removed from the right side, but show no major differences. The dactylar cutting edge of the third pereopod has the 4 proximal teeth coalesced into one large sharp tooth. There are no ventral median spines present on the abdominal somites. The first pleopod is not shorter relative to the rest and the exopodite is narrow and acuminate, longer than the basipodite, which lacks the proximal spine on its outer margin.

Paratypes: The new species is variable in the number of body and appendage spines. For example, our specimens showed the rostrum with from 5-7 dorsal, 1-7 ventral, and 0-4 lateral spines (Fig. 6). The number of spines on the proximal part of the outer margin of the scaphocerite in our material varies from 2 to 4, while the number on the distal part varies from 15 to 30. The third maxilliped sometimes has a small spine proximal to the setiferous organ. The first and second pereopods sometimes have short proximal spinules on their ischia and basises. Some specimens have minute peglike teeth separated by chitinous lamellae on the cutting edge of the first pereopod. The basipodite of the first pleopod has 0-3 spines. We could not find any correlation between the number of spines and the size or sex of the animals, but some of these differences probably reflect allometric growth changes and the normal variation in the species. Some specimens have the carapace and proximal parts of the walking legs tan or light golden brown.

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Fig. 6. *Stenopus pyrsonotus*, paratypes: A, Rostrum BPBM S8577; B, Rostrum BPBM S7887; C, Rostrum BPBM S8491. Scale bars represent 1.0 mm.

A large ovigerous specimen (BPBM S8493) has a medial ventral abdominal spine present on each segment except the sixth which bears 2 spines. A juvenile character of the new species is the absence of pleopods on the first abdominal segment in specimens with rostral carapace length less than 11 mm or post-orbital carapace length less than 7 mm (BPBM S8287, S8580).

Type locality. — Hawaiian Islands, Oahu, west coast off Pokai Bay.

Habitat. — Most of the specimens were taken in crevices, caves, or under ledges on well developed coral reef systems. This cryptic behavior is also exhibited by other members of the genus. In at least 2 observations, the new species was found with a large green-bordered moray eel, *Gymnothorax flavimarginatus*. The specimen from Pada Bay, a juvenile, was one example seen with an eel, but other large specimens were also said to have been seen with this eel species (G. M. Ludwig, written communication). These observations and the fact that these shrimp have long prominent white antennal flagella, may indicate that the new species enters into cleaning symbiosis with cooperating fish, much like its congener, *Stenopus hispidus*.

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Etymology. — The specific name is derived from the Greek "pyrsonotos" meaning red-backed; it is given because of the distinctive deep red stripe on the dorsal surface of the abdomen.

Remarks. — The new species, *Stenopus pyrsonotus*, follows closely the definition of the genus *Stenopus* Latreille given by Holthuis (1946), only differing in the absence of the lateral spines on the telson. This character separates it from all other species in the genus. It is most closely related to *S. hispidus*, but differs in color, rostrum, telson and the body spines being less erect.

Key to the Described Indo-West Pacific

Species of *Stenopus*

1. Lateral marginal spines absent on telson; abdominal somites with broad mid-dorsal red stripe *S. pyrsonotus* sp. nov.

- Lateral marginal spines present on telson; abdominal somites otherwise pigmented 2

2. Outer margin of scaphocerite serrate up to final (terminal) tooth; abdomen with oval red patches on lateral sides of second and fifth somites *S. zanzibaricus* Bruce, 1976

- Outer margin of scaphocerite with considerable nonserrate space before final (terminal) tooth; abdomen otherwise pigmented 3

3. Rostrum exceeding antennular peduncle in length, with 2-9 ventral spines; abdomen with red transverse bands on third and fifth somites

S. tenuirostris De Man, 1888

- Rostrum not exceeding middle segment of antennular peduncle in length, without ventral spines; abdomen with red transverse bands

on third and sixth somites *S. hispidus* (Olivier, 1811)

Two species of stenopodidean shrimp have so far been reported from the Hawaiian Islands, *Stenopus hispidus* (Rathbun, 1906; McNeill and Ward, 1930; Edmondson, 1946; Tinker, 1965; Hobson and Chave, 1972; Titcomb et al., 1979) and *Spongicola henshawi* (Rathbun, 1906). *Stenopus hispidus* has also been recorded from Mauritius (White, 1847; Hoffmann, 1874) along with many Indo-Pacific and Western Atlantic records reported by Holthuis (1946). The only other stenopodidean shrimp recorded from Mauritius belong to the genus *Microprosthema*. Richters (1880) reported *Microprosthema validum*, *M. scabricaudatum* and *M. plumicorne* from lie aux Fouquets, Mauritius. *Stenopus tenuirostris* is moderately common on western Indian Ocean reefs according to Bruce (1976). It has also been reported from numerous Indonesian localities (Holthuis, 1946), the Seychelles and Coetivy Islands (Borradaile, 1910), the Solomon Islands (Yaldwyn, 1968) and New Caledonia (Monod, 1976). *Stenopus zanzibaricus* was reported on the basis of a single specimen taken from Mwemba Island off Zanzibar (Bruce, 1976), but one of us (JWG) has examined another small male (total length 19.0 mm) collected from Canton Island (USNM 181402).

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A specimen of yet another new species of *Stenopus* was recently collected off Makua, Oahu. This was an ovigerous female (total length approx. 24 mm) that differs in coloration and numerous morphological characters from *S. hispidus* and *S. pyrsonotus*. Preliminary comparison with other descriptions indicates a closer relationship to the Western Atlantic *S. scutellatus*, and a full description will be presented in a forthcoming publication.

Acknowledgments

We are grateful to Dr. John E. Randall, of the Bernice P. Bishop Museum, who made it possible to examine several specimens of *Stenopus pyrsonotus* he collected and for providing the photograph of the new species taken off the west coast of Oahu.

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(JWG) Duke University Marine Laboratory, Pivers Island, Beaufort,

North Carolina 28516; (DMD) Bernice P. Bishop Museum, Department of

Zoology, P.O. Box 19000-A, Honolulu, Hawaii 96819.

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